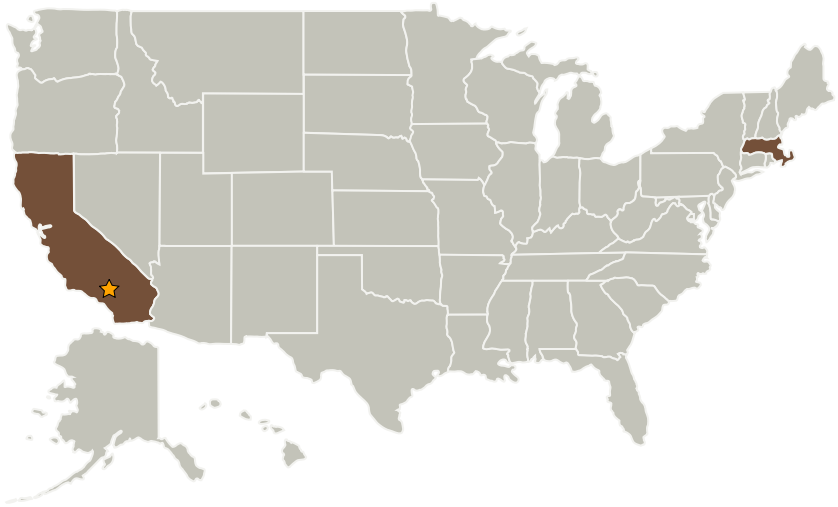
Power Replenishment Patch for Spacecraft Health Monitoring Sensors, Phase I

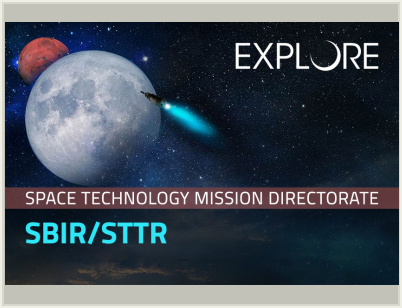
Completed Technology Project (2006 - 2006)

Project Introduction

Metis Design Corporation (MDC) proposes the development of a strain-based power replenishment technology to harvest energy for recharging remote sensors. MDC has been working to development of a structural health monitoring (SHM) device, which essentially evolves the embedding of sets of sensors into a structure to allow continuous remote monitoring. MDC's work is aimed at developing a robust infrastructure package to support a variety of sensor types and detection methods for aerospace structures. Components have been developed to acquire data, excite transducers, store and wirelessly transmit data, as well as a thin-film battery and packaging to protect the electronics from moisture, EMI and impact. During the course of this SBIR, MDC will work to develop a power replenishment patch that uses piezoelectric technology coupled with an innovative circuit design to "top-off" SHM system batteries. These thin patches would be intimately bonded to the structure in order to harvest strain energy to recharge a thin-film Lithium battery slowly over time. This concept is unique since it takes advantage of the low duty cycle of SHM electronics, instead of attempting to harvest energy for continuous system operation. MDC will demonstrate the ability to performing structural integrity testing using only harvested power.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Armstrong Flight Research Center (AFRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Armstrong Flight Research Center(AFRC)	Lead Organization	NASA Center	Edwards, California
Metis Design Corporation	Supporting Organization	Industry	Boston, Massachusetts

Primary U.S. Work Locations	
California	Massachusetts

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
  - TX13.4 Mission Success Technologies
    - TX13.4.5 Operations, Health and Maintenance for Ground and Surface Systems